

*Dissertation*

**“A STUDY ON THE ROLE OF ELECTIVE  
LAPAROSCOPIC APPENDECTOMY FOR  
CHRONIC RIGHT LOWER QUADRANT PAIN”**

**M.S. BRANCH - I**

**GENERAL SURGERY**



**MADRAS MEDICAL COLLEGE**

**THE TAMILNADU**

**Dr. MGR MEDICAL UNIVERSITY**

**CHENNAI – TAMILNADU**

**APRIL 2016**

## **CERTIFICATE**

This is to certify that, the dissertation entitled “**A STUDY ON THE ROLE OF ELECTIVE LAPAROSCOPIC APPENDECTOMY FOR CHRONIC RIGHT LOWER QUADRANT PAIN**” is the bonafide work done by **Dr.KANNAN.G** during his M.S. (General Surgery) course 2013-2016, done under my supervision and is submitted in partial fulfillment for the requirement of the M.S. ( BRANCH - I ) - General Surgery, April 2016 examination of The Tamilnadu Dr.M.G.R Medical University.

**Prof. P. RAGUMANI, M.S.,**  
Professor & Director  
Institute of General Surgery  
Madras Medical College  
Chennai - 3

**Prof. A. AFFEE ASMA, M.S.,**  
Professor of Surgery  
Institute of General Surgery  
Madras Medical College  
Chennai - 3

**Dr. R. VIMALA, M.D.,**  
**THE DEAN**  
Madras Medical College, Chennai - 3

## **DECLARATION**

I, declare that this dissertation titled **“A STUDY ON THE ROLE OF ELECTIVE LAPAROSCOPIC APPENDECTOMY FOR CHRONIC RIGHT LOWER QUADRANT PAIN”** represents a genuine work of mine. The contributions of any supervisors to the research are consistent with normal supervisory practice , and are acknowledged.

I also affirm that this bonafide work or part of this work was not submitted by me or any others for any award , degree or diploma to any other University board , either in India or abroad. This is submitted to The Tamil Nadu Dr. M.G.R Medical University, Chennai in partial fulfillment of the rules and regulations for the award of Master of Surgery Degree Branch- I ( General Surgery ).

Date:

Place:

**Dr. KANNAN.G**

## ACKNOWLEDGEMENT

As I walk down the memory lane, I realize with a deep sense of humility that what I have done now would not have been possible, but for certain luminaries, who have enlightened my path to wisdom.

“Surgery is learnt by apprenticeship and not from textbooks, not even from one profusely illustrated ” - Ian Aird.

While I put these words together it is my special privilege and great pleasure to record my deep sense of gratitude to my revered Professor and guide **Prof. A. Affee Asma. M.S.**, but for whose constant guidance, help and encouragement this research work would not have been made possible . The unflinching academic, moral and psychological support will remain ever fresh in my memory for years to come . Words cannot simply express my gratitude to them for imparting me the surgical skills I have acquired.

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All along the way, I have been supported and encouraged by all my Associate Professors and Assistant Professors who helped me to reach where I am.

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I thank the Dean, MMC & RGGGH for permitting me to conduct this study.

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With deep reverence, I salute my parents and I thank the almighty for blessing me with a wonderful family to whom I have dedicated this thesis and leave unsaid what they mean to me.

**Lap appendectomy in Chronic RLQ pain**  
BY KANNAN G

**Dissertation**

A STUDY ON THE ROLE OF ELECTIVE LAPAROSCOPIC APPENDECTOMY FOR CHRONIC RIGHT LOWER QUADRANT PAIN

M.S. BRANCH-I  
GENERAL SURGERY



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**CERTIFICATE OF APPROVAL**

To  
Dr.G.Kannan  
Postgraduate M.S.(General Surgery)  
Madras Medical College  
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Dear Dr.G.Kannan,

The Institutional Ethics Committee has considered your request and approved your study titled **"A study on the role of elective laparoscopic appendicectomy for chronic right lower quadrant pain"** No.53012018.

The following members of Ethics Committee were present in the meeting held on 20.01.2015 conducted at Madras Medical College, Chennai-3.

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| 11.Tmt.Arnold Saulina, M.A., MSW.,                        | : Social Scientist   |

We approve the proposal to be conducted in its presented form.

The Institutional Ethics Committee expects to be informed about the progress of the study and SAE occurring in the course of the study, any changes in the protocol and patients information/informed consent and asks to be provided a copy of the final report.

  
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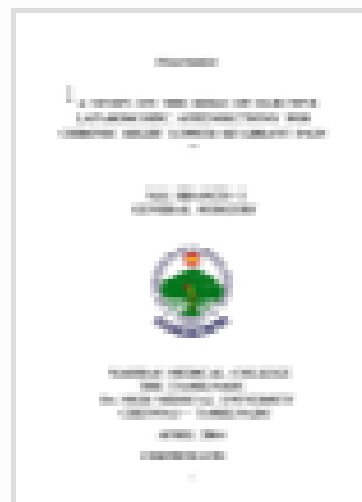


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## **ABSTRACT**

### **BACKGROUND:**

Chronic right lower quadrant abdominal pain(RLQ) is common clinical entity and continues to remain a diagnostic and therapeutic problem. Although the typical presentation of acute appendicitis is well known, there is a debate whether the so called chronic or recurrent appendicitis may cause persistent or recurrent pain in the RLQ. Chronic RLQ pain causes disability and distress and causes significant cost to health services .

Laparoscopic is changing the view regarding exploration in patients with right lower quadrant

### **AIMS AND OBJECTIVES:**

1. To study the role of elective laparoscopic appendectomy for chronic or recurrent right lower quadrant pain .
2. To study the relationship between clinical improvement and histopathological

Findings of removed appendix.

## **METHODOLOGY:**

An observational study was done in Institute of surgery, Rajiv Gandhi government Hospital ,Chennai between jan 2014 to 2015. All 50 patients with chronic or recurrent right lower quadrant pain for more than 3 months in whom routine investigations ,radiological investigations didn't reveal any pathology. Those patients subjected to laparoscopic appendectomy, then patients followed after 6 weeks and 3 months of interval.

The primary outcome measure was by pain scored by the patient ,secondary outcome was relationship between clinical improvement and histopathological findings of removed appendix.

## **RESULTS :**

In our study .it shows that 40 (80%)had complete relief of RLQ pain after 6 weeks ,and at the end of 3 months 45(90%) patients had complete relief of pain but still 5(10%) patients complained of RLQ abdominal pain.

In our study 26(52%) patients are female and 24(48%)patients are male, the age group with maximum no of cases with chronic or recurrent RLQ pain was 21-30 years.

The histopathological results for all 50 patients ,14 patients (28%) had chronic appendicitis,12 patients (24%)had features of acute appendicitis and 24 patients (48%) had normal features.

In our study no post op complications or post op deaths were encountered..

## **CONCLUSION:**

In patients with chronic right lower quadrant abdominal pain, elective laparoscopic appendectomy could be an effective therapeutic procedure in properly selected patients. Histopathological findings of removed appendix does not contribute in establishing the diagnosis in these patients.

**KEY WORDS:** Chronic right lower quadrant pain (RLQ).Chronic appendicitis,  
.Laparoscopic appendicectomy.

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## **INTRODUCTION**

Chronic right lower quadrant abdominal pain can be diagnostic challenge . These patients are seen by a lot of different physicians and the surgeons are consulted at last after other modalities have failed to provide resolution of their symptomatology.

The recent advances in laparoscopic surgery provides precise visual assessment of intra abdominal conditions for diagnosis and prompt intervention . It has a significant diagnostic and therapeutic role in patients with chronic right lower quadrant abdominal pain. In case of diagnostic uncertainty, laparoscopy may help to avoid unnecessary laparotomy, aids in planning surgical treatment by providing accurate diagnosis.

Laparoscopy allows us to treat various conditions of abdomen that could not be diagnosed otherwise. So diagnostic laparoscopy should be considered in patients presenting with chronic right lower quadrant abdominal pain, since it is minimally invasive, safe, efficacious, and invariably effective mode of diagnostic modality and can be performed rapidly with minimal sequelae and post – procedural pain.

## **AIMS & OBJECTIVES**

1. To study the role of elective laparoscopic appendectomy for chronic or recurrent right lower quadrant pain .
2. To study the relationship between clinical improvement and histopathological findings of removed appendix.

## REVIEW OF LITERATURE

### HISTORICAL BACKGROUND

*Aryateus of cappadocia* in 3<sup>rd</sup> century A.D. is reputed to have described accurately about appendicular abscesses and cured patients by incision and drainage of the abscess through the abdominal wall.

*Leonardo da Vinci* (1492) clearly depicted the appendix organ in his anatomical drawings . he called it “ Orchid ”, literally ear to denote the auricular appendage of the caecum .

*Erasmus* (1530), a great scholar was the first to record a case of appendicitis with an abscess formation.

*Claudius Amyand* (1735) performed the first reported appendectomy. He was the surgeon in St. George’s Hospital , London. It was the first occasion on which the appendix was successfully removed from a living subject. He removed an appendix that had been perforated by pin, from a hernial sac during a hernia operation .

**Mestivier** (1759) was the first to willfully open and drain the appendiceal abscess.

**Hancock** (1848) contributed to the greatest surgical advancement in treating appendiceal abscess by performing first deliberate laparotomy.

**Willard Parker** (1867) again practiced this same “ bold ” method of treatment.

**Lawson Tait** (1880) , a pioneer of abdominal surgery in great Britain , performed the first planned appendectomy on a girl with an appendiceal abscess She had recurrent pain in right iliac fossa. This milestone in history of appendicitis was not reported by Tait till 1890. Later **John shepherd** rediscovered Tait’s important contribution.

**Samuel Fenwick** (1884) in London had exhorted the surgeons to operate a perforated appendix as soon as the diagnosis was certain.

**Kronlein** (1884) was the first in removing the appendix for acute disease by incising through linea alba but his patient did not recover.



**Reginald Fitz** (1886) described acute and chronic appendicitis. He was a professor of medicine at Harvard varsity who gave a lucid and logical description of the clinical features and detailed description of the pathological changes of the disease ; he was also the first to use the term “ appendicitis ”.

**Sands** (1887) performed the closure of appendix perforation with suture.

**Treves** (1888) did the first interval appendectomy.

**Charles McBurney** (1889) described the pathological changes in appendicitis.

**Rockey** (1905) described the transverse skin incision done by **Elliot** in 1896. **Murphy** (1905) described the exact sequence of symptoms, pain then nausea, vomiting followed by fever with exaggerated local tenderness.

**Semm** (1982) is widely credited with performing the first successful laproscopic appendectomy.

**Teicher et al.** (1983) described problems related to the confusing diagnosis of acute appendicitis. This was evidenced by

negative laparotomy rate to assess the feasibility of decreasing the diagnostic error in scoring system that was made to aid in the diagnosis of acute appendicitis. It was concluded that the scoring system could have eliminated over 1/3<sup>rd</sup> of unnecessary laparotomies.

*Alvarado et al.* (1986) described a practical scoring system in establish the diagnosis of acute appendicitis. This includes,

- Leucocytosis
- Migration of pain from umbilical region to RIF
- Shift to the left
- Elevation of body temperature
- Nausea
- Rebound tenderness
- Anorexia
- Tenderness in the RIF.

Alvarado score is also called as “MANTRELS” score .

## **ANATOMY OF ABDOMEN**

The Abdominal cavity extends upwards, deep to the costal margins, into the concavity of the diaphragm and projects downwards and into the bony pelvis as pelvic cavity.

Thus , a considerable part of abdominal cavity is overlapped by thoracic cage above and by the bony pelvis below. Its dome – shaped roof is the thoracic diaphragm and its oblique floor is the pelvic inlet .

For the purpose of describing viscera's locations within, the abdomen is divided into nine regions by four planes.

The two horizontal planes namely

- Transpyloric plane of addison
- Transtubercular plane .

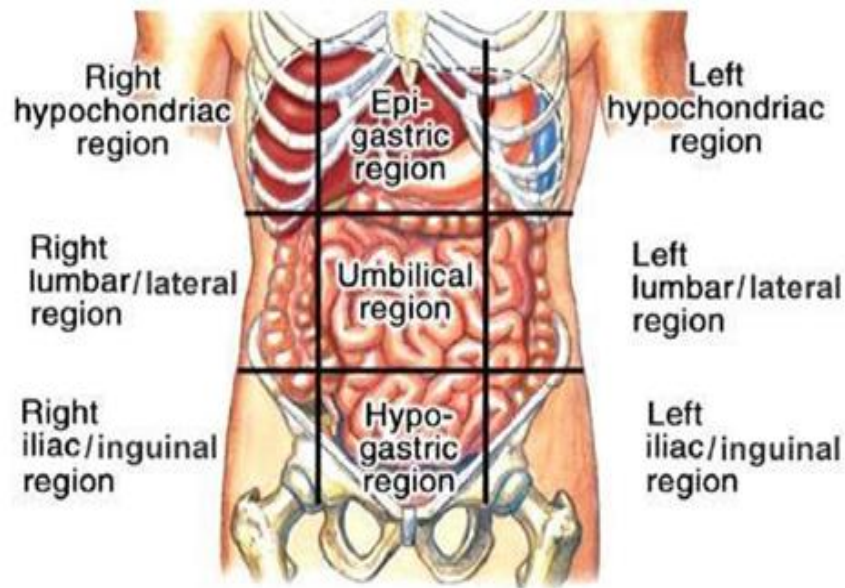
The two vertical planes are

- Right lateral plane
- Left lateral plane .

The Transpyloric plane of Addison is along the line passing through the tips of 9<sup>th</sup> costal cartilage on each side and passes through the lower border of vertebra L<sub>1</sub> .

The Transtubercular plane is along the horizontal line joining both tubercles of the iliac crests and passing through the lower border of vertebra L<sub>5</sub> .

# Regions of the Abdominal Area



The vertical planes corresponds to the vertical lines passing through the mid – clavicular lines and mid – inguinal points on either side.

The nine regions marked out this way are arranged in three vertical zones namely median , right and left .

From above downwards the median regions are

- Epigastric
- Umbilical
- Hypogastric .

From above downwards, right and left regions are

- Hypochondriac
- Lumbar
- Iliac .

Right iliac fossa is the right lateral and lower most region. The anterior wall is formed by external oblique, internal oblique, transverse abdominus muscles and fascia transversalis. The psoas and quadratus lumborum muscles and thoraco lumbar fascia forms the posterior wall . Inferiorly bounded by the posterior part of the ileum and iliacus muscle. Lateral wall is formed by external oblique , internal oblique and transverse abdominis muscles and fascia transversalis.

## **APPENDIX**

### **EMBRYOLOGY**

At about 6<sup>th</sup> week of gestation a small diverticulum appears at the caudal limb of the midgut loop and later differentiates into caecum and appendix.

According to Borman, the increasing accumulation of meconium within the colon causes the increase in diameter of this section of the intestine, because of a mucosal fold the distal part cannot be filled completely with meconium so the growth is not stimulated there and the vermiform appendix borders against the caecum as a thin structure.

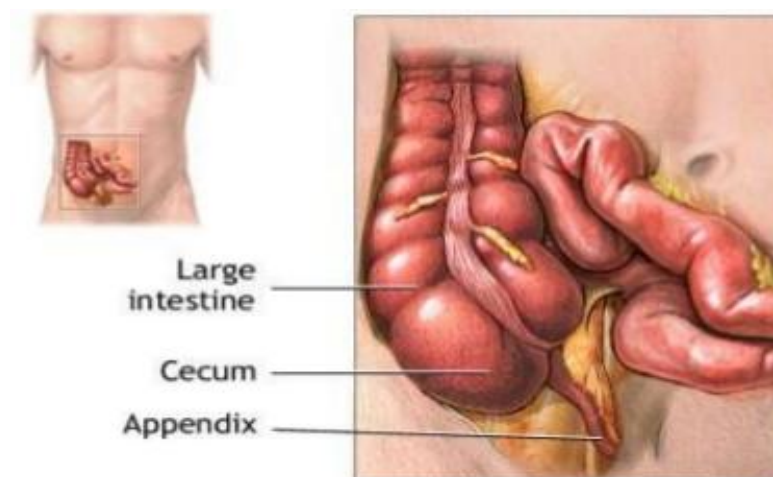
Post - partumly the caecum exhibits increased growth laterally resulting in the dislocation of the vermiform appendix along the medial direction.

Appendix develops from the post arterial segment of the midgut, along with caecum, ascending colon and the right 2/3 of the transverse colon.

### **Normal variations in the peritoneal fixation of appendix :**

- Intra - peritoneal
- Intra - peritoneal retro - caecal with in paracaecal fossa
- Extra - peritoneal retro - caecal , para - caecal fossa present
- Extra - peritoneal retro - caecal , para - caecal fossa absent
- Extra - peritoneal retro - caecal , lying anterior to the right kidney associated with sub - hepatic caecum .

### **ANATOMY OF APPENDIX**

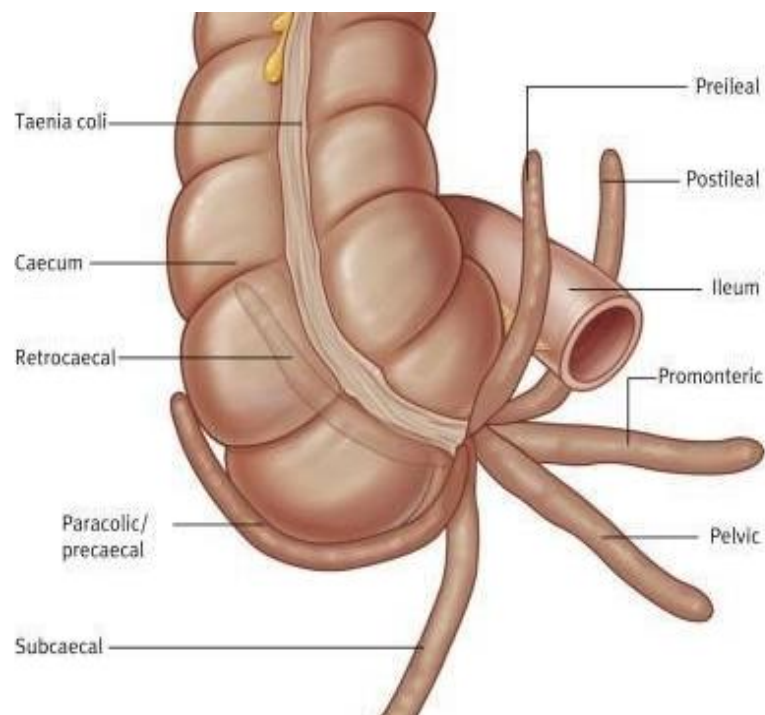


Vermiform appendix is a narrow worm shaped part of intestine , arising from the postero – medial part of the caecum 2 cm below the ileo – caecal junction.

The Taenia coli converges on the posteromedial area of the caecum, the site of the appendiceal base. The canal of the appendix is small and opens into caecum by an orifice lying below and beyond the ileo - caecal opening , this being guarded by a mucosal fold called Gerlach valve.

The length of the appendix varies from 2 – 35 cms and average length is 9 cm in adults.

**Sir Frederick Treaves** described the following positions for the vermiform appendix, using the appendix as pointer and caecum as the dial of clock .





- Para - colic or Para - caecal or 11 O' clock position
- Retro - caecal or Retro - colic or 12 O' clock position
- Splenic or 2 O' clock position ( Pre - ileal and Post - ileal )
- Promonteric or 3 O' clock position
- Pelvic or 4 O' clock position
- Mid inguinal or 6 O' clock position ( Sub - caecal position )

### **Arterial Supply**

The main appendicular artery is a branch of the lower division of ileo - colic artery, enters mesoappendix in a short distance from the base of appendix along with a branch of posterior caecal artery.

As the terminal part of artery lies on the wall of appendix , it gets thrombosed in appendicitis resulting in distal gangrene and necrosis.

In about half of the cases, an accessory artery of Sheshachalam, a branch of posterior caecal artery is found and the surgical importance is that it needs a separate ligation during appendectomy.

## **Venous drainage**

The veins in the appendix runs along the corresponding arteries and drains into the ileo - colic vein and into superior mesenteric vein, then to portal vein.

## **Lymphatic drainage :**

Lymphatic vessels from the appendix pass to lymph nodes in the mesentery of the appendix , then to ileo - colic nodes.

## **Nerve Supply :**

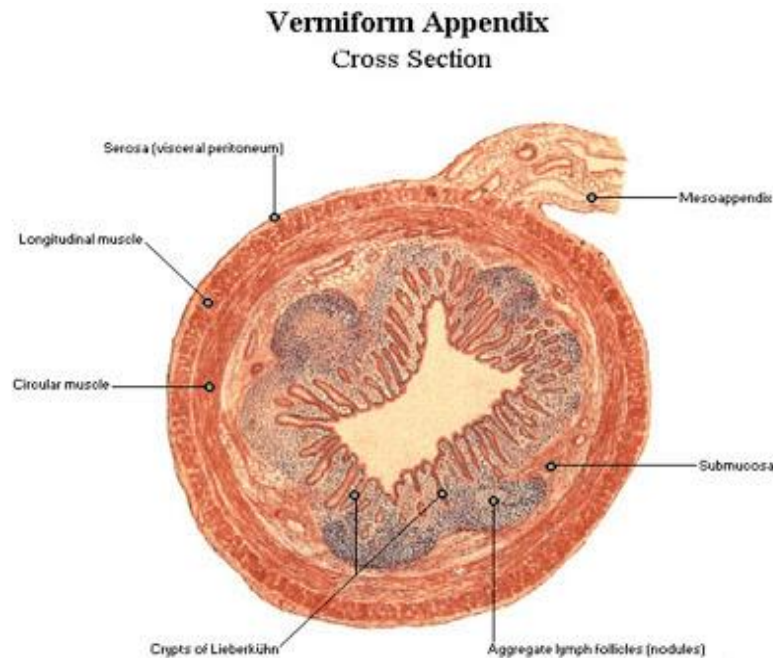
Parasympathetic nerve supply for the appendix are derived from the vagus nerves.

Sympathetic nerve supply is from the superior mesenteric ganglia and celiac ganglia.

The nerves are distributed in plexus around the ramification of the superior mesenteric artery.

The appendix is contained within the visceral peritoneum which forms the serosa and the outer longitudinal layer of the appendix being derived from the taenia coli.

The inner circular layer by the deeper interior muscle layers . Sub - mucosal layer has the lympho - epithelial tissue.



### **APPENDIX - Cross Section**

The mucosa consists of columnar epithelium with few glandular and argentaffin cells. The sub-mucosa has lymphoid follicles, which could be involved in an undefined immune function in early life.

## **CLASSIFICATION OF APPENDICITIS**

- Acute Appendicitis
- Recurrent Appendicitis
  - i. Recurrent acute appendicitis
  - ii. Recurrent sub - acute appendicitis
- Chronic Appendicitis

## **CLASSIFICATION OF ACUTE APPENDICITIS**

Acute appendicitis is again classified based on the gross and histopathological study of the inflamed appendix

- Acute focal appendicitis
- Acute suppurative appendicitis
- Acute gangrenous appendicitis
- Acute appendicitis with perforation
- Acute appendicitis with Peri - appendiceal abscess

## **ACUTE APPENDICITIS :**

The classical migratory pain is the single most reliable sign of acute appendicitis.

Typically in appendicitis, the symptoms includes abdominal pain in the umbilical region for several hours , associated with anorexia, nausea and vomiting and fever and malaise .

The pain is then localized to the McBurney's point when inflammation reaches the parietal peritoneum from the visceral peritoneum layer .

Urine pregnancy test is a must in all women of child bearing age to rule out ectopic pregnancies.

The consequences of missing an ectopic pregnancy are of grave danger and potentially life threatening .

This typical progression of symptoms is not present in atypical histories like sub-acute and even in chronic appendicitis.

It might just include pain in the right lower quadrant as a starting symptom . so these patients requires radiological imaging using ultrasound or CT scanning .

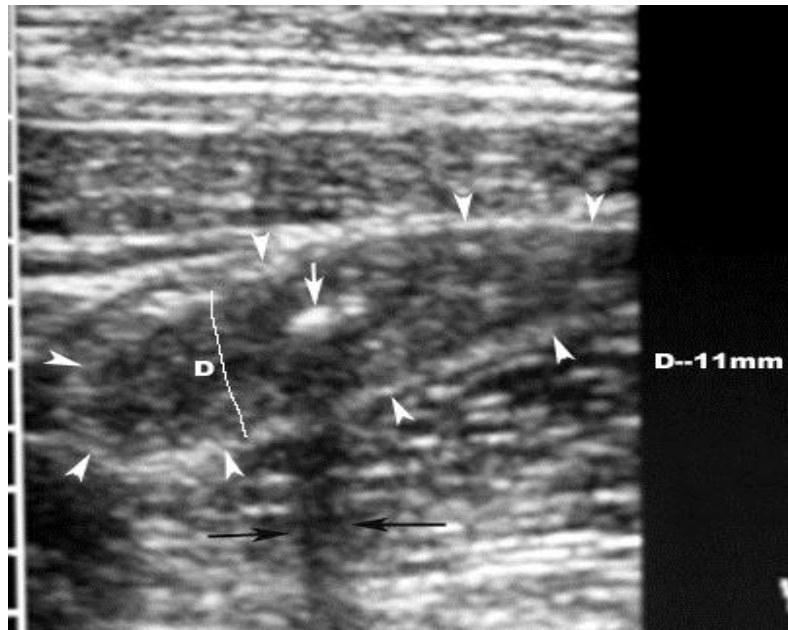
Severe complications in a case of a ruptured appendix includes the painful inflammation of the inner abdominal wall lining and sepsis.

The classical findings of appendicitis in **USG Abdomen** :

- Aperistaltic, non - compressible and dilated appendix with an outer diameter more than 6mm .
- Appendiceal layers appears distinct .
- On axial section, target appearance is seen.
- Appendicolith .
- Peri - appendiceal collection of fluid.
- Echogenic prominent pericaecal fat.

The technique used is known as Graded Compression and in this the linear probe is used over the site of maximum thickness.

## USG - Appendix



### Appendicitis with Appendicolith

White arrow - Appendicolith

Black arrows - Posterior shadowing

Arrow heads - Distended appendix

D is the diameter of the appendix measuring more than 6mm.

## USG - Appendix



USG appendix showing dilated appendix.

The classical findings of Appendicitis in **CT Abdomen** :

- Appendix fails to get filled with oral contrast medium
- Diameter of the appendix greater than 6mm
- Dilated bowel loops
- Enhancement of wall of the appendix with an intravenous contrast medium



- Peri - appendiceal inflammation or inflammatory fatty infiltration
- Free fluid presence in cul - de - sac
- Peri - caecal lymphadenopathy
- Thickening of the caecal wall
- Extra - luminal gas from the perforation
- Abscess
- Inflammatory (phlegmon) mass
- Air pockets
- Contrast enhancement

## CLINICAL SIGNS

### ACUTE APPENDICITIS :

- **Blumberg's sign** - rebound tenderness at McBurney's point in the right lower quadrant .
- **Rovsing's sign** - pain in the right lower quadrant when left lower quadrant is palpated .
- **Obturator sign** - pain on internal rotation of the hip indicating pelvic appendicitis.
- **Iliopsoas sign** - pain on extension of the hip indicating the presence of retrocaecal appendicitis .
- **Ten Horn sign** - pain caused by gentle traction of right testicle

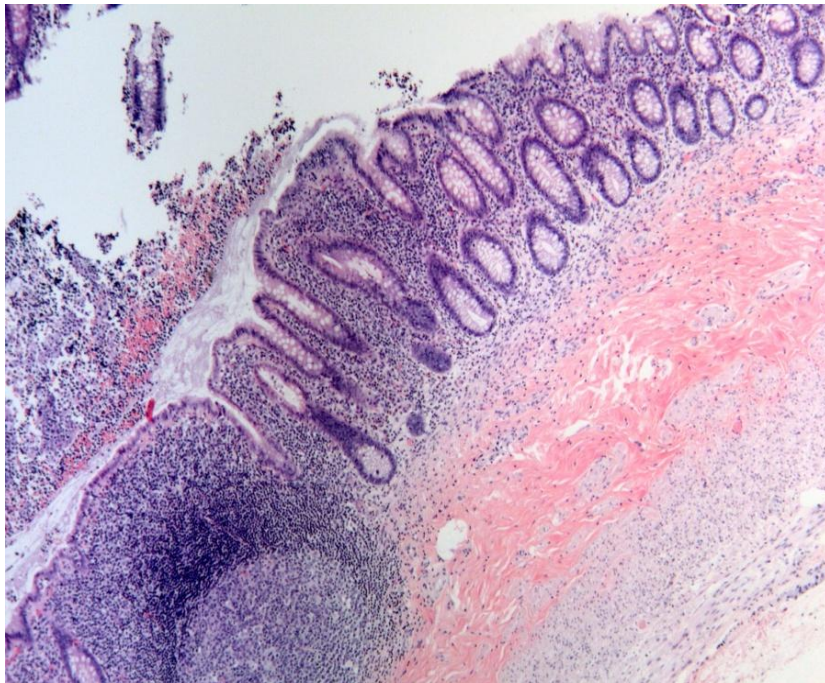
### CHRONIC APPENDICITIS :

- **Bassler sign** - sharp pain created by compressing appendix between abdominal wall and iliacus muscle.

## HISTOLOGY

- **ACUTE APPENDICITIS :**

In early acute appendicitis, there is congestion of the subserosal vessels, and perivascular neutrophilic infiltration in all layers of the wall .



The normal glistening serosa is transformed into a dull, granular, erythematous surface by the inflammatory reaction .

The definitive diagnosis is based on the pathological findings of the removed appendix only.

The histological finding pathognomonic of appendicitis is neutrophils infiltrating the muscularis propria.

Although mucosal neutrophils and focal superficial ulceration are often seen during the pathological study, these are not used as specific markers of acute appendicitis.

### **CHRONIC APPENDICITIS:**

In chronic inflammation of the appendix, there is lymphocytic and eosinophilic infiltration along with fibrosis, granulomatous reaction and foreign body giant – cell reaction (Rao *et al.* 1998 )

### **PAIN**

Pain is derived from latin word "poena", which means penalty or torment.

Pain is the most common of the gastrointestinal manifestations than any other symptoms that leads to surgical interventions.

Due to the complexity in the arrangement of innervations by parietal and visceral networks in the abdomen, it is a big deal to point out the precise site of pain and fortunately general patterns emerge.

The peritoneum includes a visceral layer with autonomic innervations and a parietal layer with somatic innervations.

During normal embryonic development of viscera in the abdomen, there is a procession of bilateral midline autonomic innervation.

So due to this when pain arises, it is usually perceived as a midline pain.

The pain from visceral layer is usually not well – localized, and is cramping or burning or gnawing type since they are of autonomic innervations.

And mostly accompanied by autonomic symptoms like sweating, nausea, vomiting, perspiration and pallor.

The position of pain in the midline is by embryological origin of the concerned viscus and pain from intra – abdominal

viscera is perceived so, because sensory input enters spinal cord from both sides.

The anterior and lateral abdominal walls are supplied by nerves of spinal segments from T<sub>7</sub> to L<sub>1</sub>.

The posterior abdominal wall is innervated by spinal segments L<sub>2</sub> to L<sub>5</sub> and the pain fibers enter the spinal cord ipsilaterally, so it is perceived as originating from the sides and it is localized too.

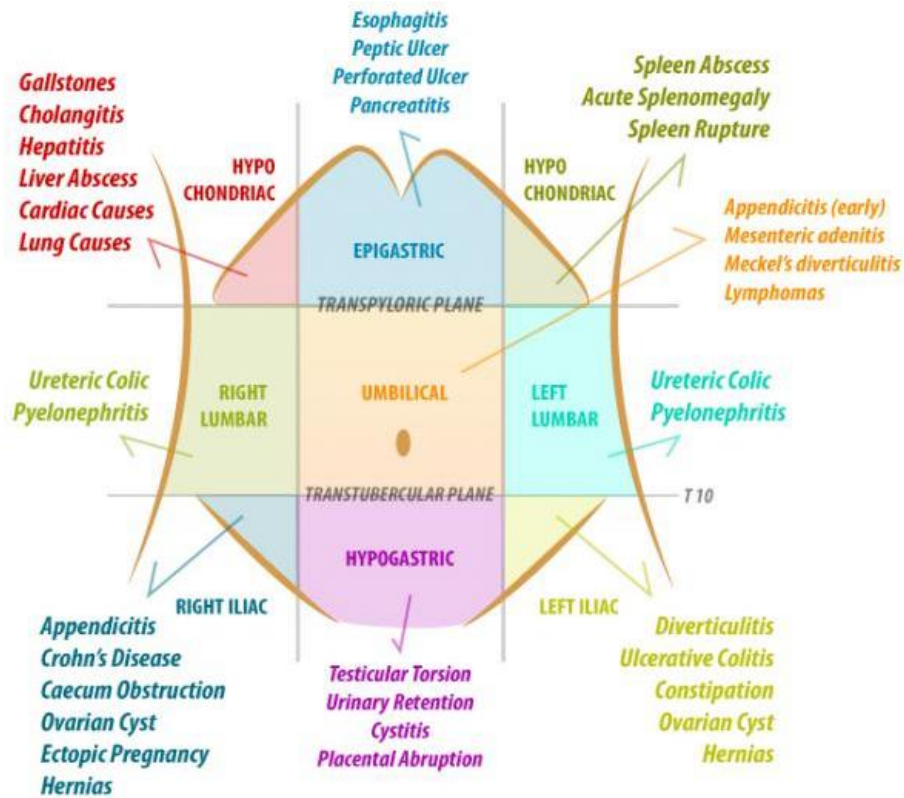
On the other hand, somatic pain is localized and perceived as arising from one of the quadrants of the abdominal pain.

Epigastric pain - Foregut origin

Periumbilical pain - Midgut origin

Hypogastric pain - Hindgut origin

Pelvic pain - Cloaca derived structures



## PAIN MAP OF ABDOMEN

Visceral stimulations that results in abdominal pain are

- Stretching
- Traction
- Compression and torsion

Other factors are

- Ischemia
- Inflammation

Referred pain is the one in which pain is felt somewhere other than the origin site and is a characteristic of abdominal pain.

Referred pain arises from deeper structures and is sharp, localized and kind of persisting at the distant site.

It occurs due to shared central pathways for the afferent neurons that are arising from different sites due to dermatomes.

Associated features are hyperalgesia of the skin along with increased muscle tone of the abdominal wall.

#### **ACUTE ABDOMINAL PAIN :**

Pain lasting for less than 8 hours.

#### **CHRONIC ABDOMINAL PAIN :**

Pain persisting more than 3 to 6 months.

It is divided into two types

- 1) Diagnosable
- 2) Undiagnosable



## **CAUSES OF RIGHT LOWER QUADRANT PAIN :**

- Chronic and recurrent appendicitis
- Endometriosis
- Adenomyosis
- Uterine leiomyomas
- Pelvic adhesive diseases
- Infectious colitis
- Meckel's diverticulitis
- Right ureteric colic
- Right sided diverticula
- Inflammatory bowel diseases

In addition to these diseases, in immunocompromised individuals neutropenic enterocolitis is considered in the differential diagnosis and tuberculosis of the abdomen is also considered.

## **CLINICAL EVALUATION :**

Patients presenting with chronic right lower quadrant abdominal pain is evaluated by

- 1) History
- 2) Physical examination

- 3) Laboratory studies
- 4) Radiological studies
- 5) Empirical interventions

## **HISTORY :**

Detailed history from the patient is obtained regarding ,

- Site, intensity, character, duration of pain and aggravating, relieving factors.
- Fever, nausea.
- Appetite, satiety , diet, reflex emesis .
- Stool pattern , consistency, completeness of evacuation .
- Family history .
- Medications and previous surgery.
- Co – morbid illness.

## **PHYSICAL EXAMINATION :**

- General examination to assess the condition of the patient.
- Abdominal findings like distension , location of pain .
- Liver , spleen and ascites.
- Rectal and pelvic examination .

## **LABORATORY STUDIES :**

- CBC
- TC
- DC
- ESR
- Viral markers ( HIV , Hep B )
- Urine analysis
- Urine - culture and sensitivity
- Stool for occult blood
- Stool for parasites .

Further investigations can be added up based on the history and the findings of the physical examination of the patient .

## **RADIOLOGICAL STUDIES :**

- USG – Abdomen and pelvis mainly to rule out the non intestinal causes of pain .
- Abdominal CT for evaluation of extra – intestinal mass lesions and retroperitoneal lesion

## **EMPIRICAL INTERVENTIONS :**

Empirical interventions are considered as a part of diagnostic evaluation .

It begins with educating the patients as well as their relatives regarding the differential diagnoses for the condition and the appropriate interventions.

Frequency of pain along with related events and responses like vomiting , fever must be documented.

After establishing the etiology for chronic right lower quadrant pain, careful follow- up of the patient is necessary.

It is to monitor the compliance of the patient with the method of treatment given and also in the restoration of normal activities of the patient.

Diagnostic laparoscopy is an effective approach for the management in the patients with chronic right lower quadrant pain .

## DIAGNOSTIC LAPAROSCOPY

Diagnostic laparoscopy is a minimally invasive surgical procedure that allows the visual examination of intra – abdominal organs so as to detect pathology.

Diagnostic laparoscopy was first introduced in 1901, german surgeon ***George Kelling*** performed a “ peritoneoscopy ” in a dog and these procedures were called as “ celioscopy ”.

A Swedish internist ***Hans Christian Jacobaeus*** performed the first diagnostic laparoscopy in humans in 1903 and he was the one who coined the term “ laparothorakoskopie ” in 1911 .

***Betram Berheim*** , a surgeon from Johns Hopkins in 1911 performed laparoscopy with proctoscope in two of his patients with carcinoma of pancreas .

***Ruddock*** in 1934 was the first to use biopsy forceps equipped with monopolar electrocautery during laparoscopy .

The diagnostic values of emergency laparoscopy have been established and been proved around 1950s and 1960s .

*Philippe Mouret* was the first to perform the laparoscopic cholecystectomy.

Diagnostic laparoscopy allows us to perform rapid and thorough inspection of the paracolic gutters and pelvic cavity which is not possible with open laparotomy

Diagnostic laparoscopy is better when compared to open laparotomy in the absence of adhesions where the whole peritoneal cavity can be visualized and it improves the diagnostic accuracy to avoid non – therapeutic laparotomy.

Diagnostic laparoscopy was mainly introduced as the final staging investigation in Gastro – intestinal cancer patients .

The main aim was to detect peritoneal , superficial liver or lymph node metastasis and locally advanced disease that could be missed on radiological staging .

This can be useful in diagnosing

- Acalculous cholecystitis ,
- Perforated viscus ,
- Acute appendicitis ,
- Mesenteric ischemia ,
- Other surgical emergencies in critically ill patients and with equivocal abdominal examination.

#### **CONTRA - INDICATIONS :**

- Hemodynamic instability ,
- Mechanical or paralytic ileus ,
- Generalized peritonitis ,
- Uncorrected coagulopathy ,
- Abdominal wall infection ,
- Late pregnancy .

## **CHRONIC APPENDICITIS**

Without the presence of an acute febrile illness, few patients complaints of right lower abdominal pain. On CT scan , some were found to have appendicoliths or enlarged appendiceal diameter by sonography.

There will be pathological and surgical evidences of chronic inflammation and also relief from symptoms after doing appendectomy, hence supporting the fact that appendicitis indeed shows a wide spectrum of inflammatory changes.

Chronic appendicitis could be the explanation in some patients with lower abdominal pain persisting for weeks to years , but they don't present with typical features of acute appendicitis.

Diagnosis is more difficult because of typically normal radiological and lab studies, but confirmation is done by pathological studies only .

There may be general malaise or various digestive symptoms which are called Appendicular dyspepsia (Kerr,1962) .



## **RECURRENT APPENDICITIS :**

Recurrent appendicitis represents a pattern of symptoms with spontaneously resolving self-limiting right lower quadrant abdominal pain that lasts for few hours. Once the appendix becomes inflamed, further attacks occurs at gradually shortening intervals .

Diagnosis of recurrent appendicitis is mostly retrospective i.e after appendectomy .

After appendectomy , on pathological studies there are frequent signs of both acute and chronic inflammation , providing further more evidences for this clinical entity .

While in chronic appendicitis , the pain and tenderness is constant well-localised in the right lower quadrant with no other abdominal or pelvic diseases that could be identified.

In these cases appendectomy is considered to be curative , but if pain tends to recur or there is no relief of symptoms then they are ultimately diagnosed to have Crohn's disease..

## **CHRONIC PELVIC PAIN :**

Chronic pelvic pain is defined as pain below umbilicus lasting for atleast 6 months or causing functional disability , that requires treatment .

As far as gynaecology is concerned, chronic pelvic pain could be due to

- Endometriosis ,
- Adenomyosis ,
- Uterine leiomyomas ,
- Adhesive diseases .

## **ENDOMETRIOSIS**

Ectopic endometrial glands and stroma are found outside the uterus in Endometriosis . Endometriosis can cause large complex masses to be produced and are popularly known as "chocolate cysts". Ovaries, pelvic peritoneal surfaces and uterosacral ligaments are commonly involved.

Other possible sites of involvement are sigmoid colon, retroperitoneal space, rectovaginal septum, uterus, umbilicus, incisional scars, intraperitoneal organs and even in thoracic cavity

Endometriosis can also cause increase in serum Cancer antigen 125 (CA- 125). Endometriosis is treated by Operative laparoscopy with endometrial ablation using CO<sub>2</sub> laser or electrocautery and resection of deeply seated implants of endometrial glands .

## **PELVIC INFLAMMATORY DISEASE**

It is an infection involving the uterus , fallopian tubes and ovaries of the upper female genital tract resulting in endometriosis, salpingitis, oophoritis. This involves adnexal pelvic organs resulting in peritonitis, tubo- ovarian abscesses and peri – hepatitis occasionally and this is known as Fitz - Hugh - Curtis syndrome.

Pain and tenderness is usually diffuse and confined to lower abdomen and the motion of the cervix can cause exquisite pain.

Fever and leukocytosis might be minimal or absent and because this pain occurs during the mid – point of the menstruation , it is termed as “mittelschmerz”

It is mostly an ascending sexually transmitted infection caused by *Neisseria gonorrhoeae* , *Chlamydia trachomatis* and even normal vaginal flora is involved . Intracellular diplococci could be demonstrated on the smear prepared from the purulent vaginal discharge of the patient with infection .

Differential diagnosis includes ,

- Appendicitis ,
- Cholecystitis ,
- Pyelonephritis ,
- Nephrolithiasis ,
- Ovarian torsion ,
- Inflammatory bowel disease .

On a long run it leads to infertility, chronic pelvic pain and increase in ectopic pregnancies .

## INFECTIOUS COLITIS

Infectious colitis can be caused by

- *Campylobacter jejuni* ,
- *Yersinia enterocolitica* ,
- *Salmonella typhi* ,
- *Clostridium difficile* .

*Y. enterocolitica* infections are common in infants and younger age group, in the ileocaecal region typically, which produces a clinical picture similar to that of the appendicitis, Crohn's disease .

*C. jejuni* causes symptoms similar to that of non – specific IBDs which includes, bloody diarrhea, abdominal pain , fever , nausea and vomiting. It is treated with Ciprofloxacin .

*C. difficile* infection produces toxins (A and B), which together results in pseudo-membranous colitis. Toxin A is a potent chemoattractant and Toxin B is a potent cytotoxin . The colitis caused by this *C.difficile* is otherwise known as Pseudomembranous colitis .

*S. typhi* causes typhoid fever and the endotoxins produced by the bacterium is responsible for the symptoms . Intestinal perforations and toxic megacolon have been known to occur and massive lower GI bleeding and Gangrenous cholecystitis have been reported .

### **MECKEL'S DIVERTICULUM :**

First reported in 1598 by Hildanus and later described in detail by John Meckel in 1809 . It is due to incomplete closure of omphalomesentric or vitello-intestinal duct and is located on the antimesentric border of ileum , proximal to the ileocaecal valve by 45 to 60 cm .

Meckel's diverticulitis is the important differential diagnosis in patients presenting with right lower quadrant pain , which is indistinguishable from appendicitis clinically.

In children, diagnostic test with most accuracy is Scintigraphy with sodium <sup>99m</sup>Tc- pertechnetate, which is taken up by gastric tissue in the diverticulum preferentially.

In adults , the specificity and sensitivity of this test is increased by using pentagastrin and glucagon or cimetidine or other H<sub>2</sub> receptor blockers , as they all result in higher radionuclide concentrations in the diverticulum's wall .

The treatment is surgical resection of the diverticulum or the segment of the ileum with diverticulum ..

Segmental intestinal resection is necessary for patients with bleeding , as the bleeding site is mostly in the ileum adjacent to the diverticulum .

## **RIGHT URETERIC COLIC :**

In right ureteric colic , loin pain radiates to the right iliac fossa and the genitalia

This radiation of pain from the right iliac fossa to the genitalia is usually due to passage of calculi but passage of a blood clot or even sloughed renal papilla gives rise to similar kind of pain .

## **INVESTIGATIONS**

### **1) Radiography :**

A KUB film reveals kidneys , ureters and bladder . Branching of a renal calculus is consistent with the diagnosis .

An opacity maintaining its relative position in the urinary tract during respiration is most likely a calculi .

### **2) Contrast enhanced CT :**

Spiral CT is the investigation preferred .

### **3) Excretion Urography :**

Done to localize the exact anatomical location of the calculi.

### **4) Ultrasound :**

Used in locating stones for treating with Extracorporeal shock wave lithotripsy ( ESWL ).

These are the main stream of investigations being used to assess patients with renal colic pain .



## **RIGHT - SIDED DIVERTICULA**

Incidence of Right - sided diverticula is more common than left - sided diverticula in younger patients and are mostly asymptomatic.

As patients are young , presenting with right lower quadrant pain, they are mistaken for acute appendicitis and diagnosis is made only at the time of surgery.

For a minimally inflamed single large diverticulum, a diverticulectomy will suffice but ileocaecal resection is preferred.

## **INFLAMMATORY BOWEL DISEASE :**

- Ulcerative colitis ,
- Crohn's disease and
- Indeterminate colitis .

Among the other factors ,

- Mycobacterium paratuberculosis
- Listeria monocytogenes
- Paramyxovirus
- Measles virus

Also have been attributed to the etiology for the inflammatory bowel disease.

In ulcerative colitis , inflammatory cells infiltrates mucosa and sub-mucosa and multiple pseudopolyps can be seen endoscopically and there is continuous involvement of rectum and colon unlike Crohn's disease

In Crohn's disease, inflammation is trans-mural and predominantly sub-mucosal and there is rectal sparing or skip lesions and are seen endoscopically as deep serpiginous ulcers and "cobblestone" appearance.

The anti – saccharomyces cerevisiae antibody (ASCA) and perinuclear anticytoplasmic antibody (pANCA) are the serological markers used in differentiating crohn's from ulcerative colitis .

## **CLINICAL PRESENTATION**

Classical symptoms in Crohn's disease are

- Abdominal pain ,
- Diarrhea ,
- Weight loss ,

- Anorexia ,
- Fever ,
- Recurrent aphthous ulcers .

## **DIAGNOSIS :**

It is established by combining clinical, endoscopic, and radiologic features. The common radiological findings are skip lesions, longitudinal and transverse ulcers, cobblestone mucosa, haustral margin thickenings and irregular nodular defects.

CT aids in recognition of thickening of colon, intra- abdominal abscesses and adenopathies.

## **INDICATIONS FOR SURGERY**

- Intestinal obstruction
- Intra-Abdominal abscess
- Fulminant colitis
- Toxic megacolon
- Massive bleeding
- Cancer

## **SURGICAL PROCEDURES**

- Ileocecal resection
- Total Proctocolectomy with End ileostomy
- Total abdominal colectomy with ileorectal anastomosis
- Segmental colon resection

## **TUBERCULOSIS :**

Mostly symptoms starts with fever and attacks of abdominal pain and intermittent diarrhea.

Ileum is distended above the partial obstruction and due to stasis with super - added infections, it leads to steatorrhoea , anemia and loss of weight .

Differential diagnosis includes ,

- Appendicular mass
- Carcinoma caecum
- Crohn's disease
- Actinomycosis of caecum .

A small bowel enema or a barium meal follow-through will reveal the defect radiologically. It presents as mass in the right iliac fossa indistinguishable from ileo - cecal tuberculosis.

Ileocaecal resection is the considered operative mode of treatment with Anti - tubercular therapy (ATT) .

### **IMMUNOSUPPRESSED PATIENTS :**

In HIV – infected patients presenting with right lower quadrant pain , the differential diagnosis should be expanded when compared to general population . Opportunistic infections should be given importance as far as HIV – infected patients are concerned along with other possible causes of right lower quadrant pain.

Neutropenic enterocolitis ( typhilitis ) is also taken into consideration in differential diagnosis of HIV – infected patients with right lower quadrant pain.

### **MESENTERIC LYMPHADENITIS :**

In school going children, gastroenteritis presents with abdominal pain along with diarrhea without fever or leukocytosis. The commonest condition mimicking appendicitis in this group is mesenteric

lymphadenitis. USG helps with the identification of enlarged ileal mesentry lymph nodes along with ileal wall thickening.

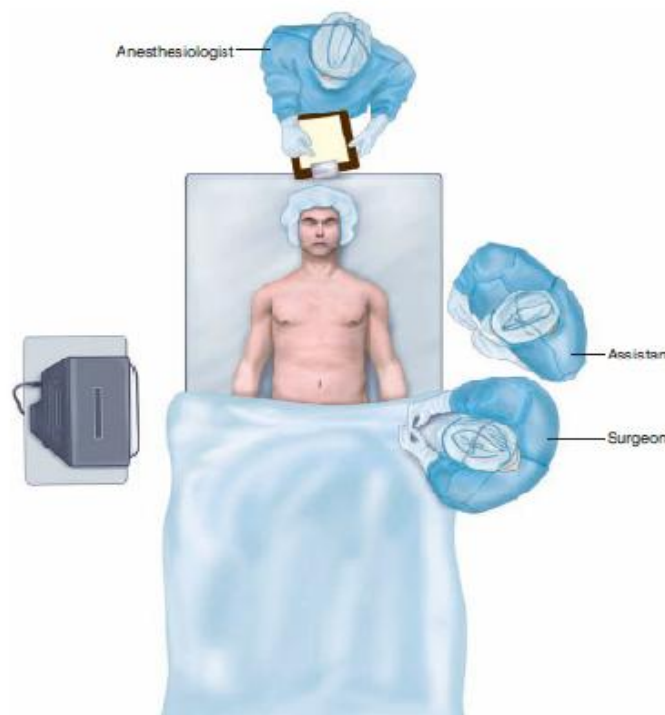
### **RARE DIFFERENTIAL DIAGNOSIS OF RLQ PAIN :**

- Sigmoid diverticulitis
- Tabetic crisis
- Tuberculosis of spine
- Metastatic carcinoma in spine
- Osteoporotic vertebral collapse
- Multiple myeloma
- Pre – herpetic pain of the right 10<sup>th</sup> and 11<sup>th</sup> dorsal nerves
- Abdominal crisis of porphyria
- Abdominal crisis of diabetes mellitus
- Typhilitis or Leukaemic ileocaecal syndrome

## LAPAROSCOPIC APPENDECTOMY

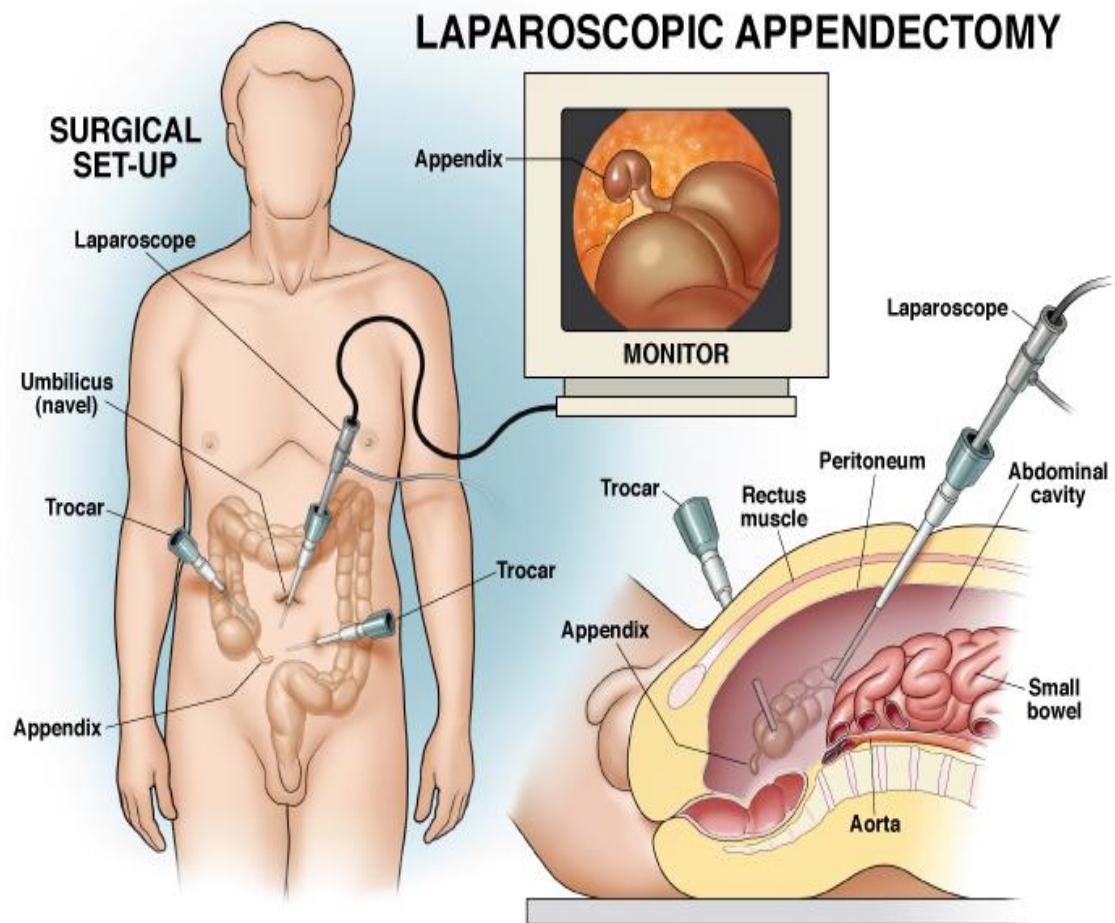
Kurt Semm in 1982 performed the first reported laparoscopic appendectomy.

Under general anaesthesia , first patient is placed in supine position with left arm tucked and strapped . Oro – gastric or Naso – gastric tube and Foley’s catheter are placed under sterile conditions .

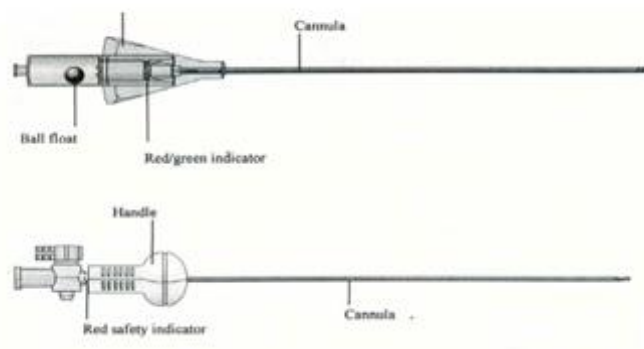


Monitor is placed to the right of the patient. Both the surgeon and assistant should be standing to the left of the patient .

Three ports are used in a standard laparoscopic appendectomy, one at umbilicus and a supra - pubic and a left lateral port.



At umbilicus , a 10 - 12 mm port and at suprapubic and in the left lower quadrant two 5 mm ports are placed .





## **VERESS NEEDLE**

Open Hassan technique, use of Veress needle, use of an optical view Trocar under laparoscopic visualization are the important methods to gain a safe access into the peritoneal cavity.



## **HASSAN'S TROCAR AND CANNULA**

Great care must be taken to avoid injury to the epigastric vessels, underlying organs of the viscera and urinary bladder.

Pneumoperitoneum is created with CO<sub>2</sub> insufflation through the secured 12 mm port .

Then the patient is placed in trendelenburg position and left lateral decubitus position .

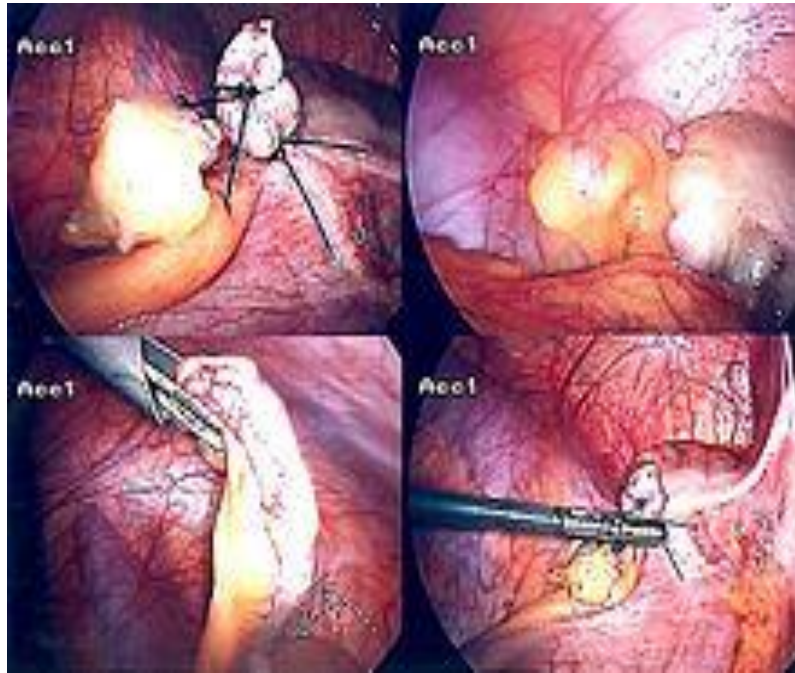
After thorough inspection of the whole of peritoneal cavity , loops of small intestine are mobilized out of the right lower quadrant , so as to expose the caecum and terminal ileum and base of the appendix is searched for.

The base of appendix is usually found by following the taenia coli of the ascending colon proximal to the convergence of the taenia in the caecum.

It can be found by following the fat pad between the terminal ileum and the base.

After being brought into view by blunt dissection of inflammatory adhesions with the adnexal visceral organs and elevated to reveal the appendiceal artery in the mesoappendix.

Mesentric window is created between the mesoappendix and the appendix at its base. Transection of the appendiceal base is done by using a linear stapling device close to its base.



If the base is inflamed, perforated or dilated, the stapler must be placed in such a way that a part of normal caecum is removed too.

The appendix can be also be divided by using scissors after suture ligation with an endoloop.

Then mesoappendix is divided with a linear stapler. To ensure hemostasis, a cartridge with 2.5 mm staple height is used.

For isolation and ligation of the appendiceal artery , one can use clips , ultrasonic dissector or bipolar cautery.

The stump of the appendix and mesoappendix are then irrigated with normal saline and checked for hemorrhage or leaks.

The appendix is removed through the umbilical port site and then the specimen is examined carefully to make sure that it is indeed the appendix, not just an inflamed mesoappendix that has been just removed.

Contaminated areas are well irrigated with normal saline so as to prevent the formation of abscess postoperatively.

Pneumoperitoneum is evacuated after careful inspection of port sites and ports are removed.

Non - Absorbable suture is used for fascial defect at the umbilical port site and Sub - cuticular absorbable suture for the skin. Sterile dressing is done.

#### **ADVANTAGES :**

- It is used as both diagnostic as well as therapeutic tool.
- Minimally invasive procedure .
- Lesser post - op pain .
- Minimal hospital stay .
- Fewer post - op adhesions .
- Better cosmetic results .
- Procedure of choice in obese patients.

- The incision remains the same even in difficult appendectomies like retrocaecal appendix.

#### **DISADVANTAGES :**

- More expensive compared to conventional techniques.
- Learning curve is high and requires great expertise.
- Procedure is not helpful if perforation or peritonitis is present.
- Operating time is more compared to open appendectomy.

#### **COMPLICATIONS :**

It can be briefly classified as :

a) General

b) Specific

- Veress needle insertion .
- Trocar insertion .
- Intraoperative injuries.
- Pnuemoperitoneum complications .

## **VERESS NEEDLE INSERTION**

Injury to the vessels can occur and the viscera that is with higher chances of injury is the small bowel. In patients who has had previous abdominal surgeries, open technique by using hassan's cannula or adjacent method using ultrasound has been advised to create a safe pneumo peritoneum.

## **TROCAR INSERTION**

Injuries to major vessels or visceral injury could occur with blind insertion either directly or after pneumo – peritoneum creation.

Nuzzo et al concluded that the best prevention of severe trocar related injuries is by routine usage of open technique for pneumo – peritoneum.

## **INTRAOPERATIVE INJURIES**

The most common of them all are to the vascular, alimentary and urinary systems and the mechanisms due to which injury occurs during the surgery are,

- Direct cut or puncture .
- Thermal injury secondary to cauterization .
- Crush injury.
- Traction injuries.

## **PNEUMO – PERITONEUM COMPLICATIONS**

As CO<sub>2</sub> gas is used for insufflation of peritoneal cavity , it results in elevation of Central venous and systemic arterial pressures.

The rise in systemic blood pressure is mainly attributed to the sympathetic drive secondary to the hypercarbia and also to a lesser extent on the increase in the pressure over the abdominal aorta. It is also accompanied by fall in arterial pH, PO<sub>2</sub> and a rise in PCO<sub>2</sub>. Serum chloride levels falls .

### **ARRHYTHMIA :**

Bradycardia due to reflex vagal stimulation is the most frequent to occur and the most common with CO<sub>2</sub> insufflation. other arrhythmias are due to inadequate ventilation, which are bigeminal rhythm , ventricular beats and ventricular tachycardia .

- **CARDIAC OUTPUT :**

Stroke volume and cardiac output diminishes after severe hypercarbia, especially with higher intra-abdominal pressures exceeding 20 mmHg .

- **GAS EMBOLISM :**

Due to solubility of CO<sub>2</sub>, gas embolism is rare but recorded. Mostly due to the displacement of the veress needle either in the body of the uterus or liver . Flow rate should not exceed 1.0 L of CO<sub>2</sub> per minute when insufflating the peritoneal cavity .

- **MEDIASTINAL EMPHYSEMA :**

More common in patients with hiatus hernia and during peri esophageal laparoscopic surgery, when it is accompanied by surgical emphysema of the neck and upper chest wall .

## **WOUND COMPLICATIONS :**

- Bruising ,
- Super – added infections ,
- Leakage of ascitic fluid ,
- Hernia formation.

The application of laparoscopic technique has revolutionized the field of general surgery to such a level that has led to rapid application of laparoscopic techniques to a wide range of surgical problems preventing diagnostic laparotomies for many diseases with various presentations in different patients.



## **MATERIALS AND METHODS**

**Sample size :** 50 cases

**Study design :** Prospective and observational study

**Study population :** 50 cases

**Study period :** Jan 2015 to Sep 2015

**Study Centre :** Madras Medical College and Rajiv Gandhi Government General Hospital , Chennai .

**Subject Selection :**

**Inclusion Criteria:**

1. Patients with chronic or recurrent right lower quadrant pain for more than three months in whom routine investigations didn't reveal any pathology
2. Age > 18 yrs
3. Patient should have experienced continuous pain or atleast one pain attack in the month prior to inclusion

**Exclusion criteria :**

1. Age < 18 yrs & > 60 yrs
2. Previous abdominal surgery
3. Known case of specific gastrointestinal, gynecological or urological diseases
4. Diagnostic laparoscopy reveals abnormalities other than those related to appendix

**Assessment of Parameters:**

Pain score :

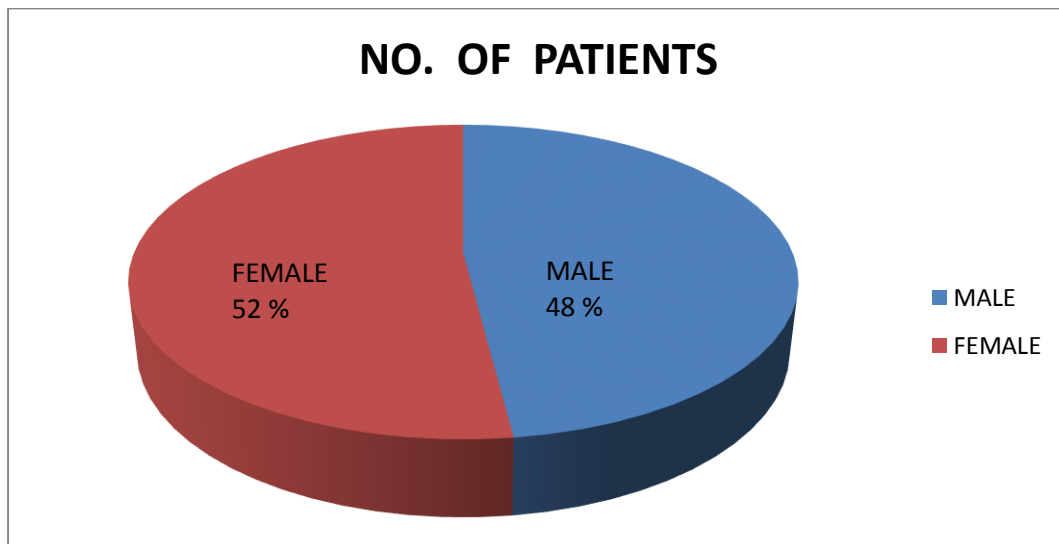
1. Pain unchanged ( or evenworse ).
2. Remarkable reduction of pain, but not completely pain free.
3. Completely pain free, no more right lower abdominal complaints.

Histopathology – Normal or having signs of appendicitis

## STATISTICAL ANALYSIS

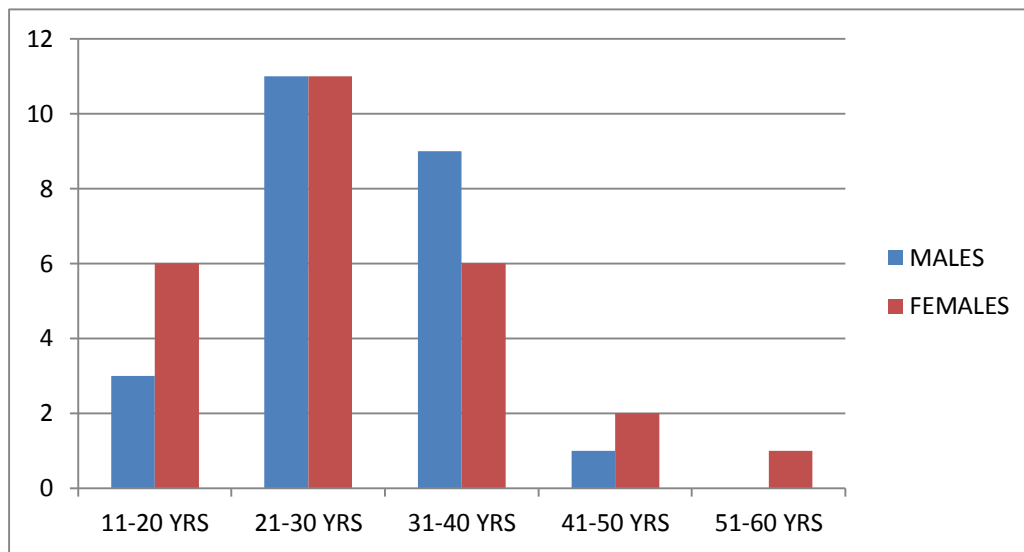
Sex				
	Frequency	Percent	Valid Percent	Cumulative Percent
F	26	52.0	52.0	52.0
Valid M	24	48.0	48.0	100.0
Total	50	100.0	100.0	

**Tab 1. Sex distribution**



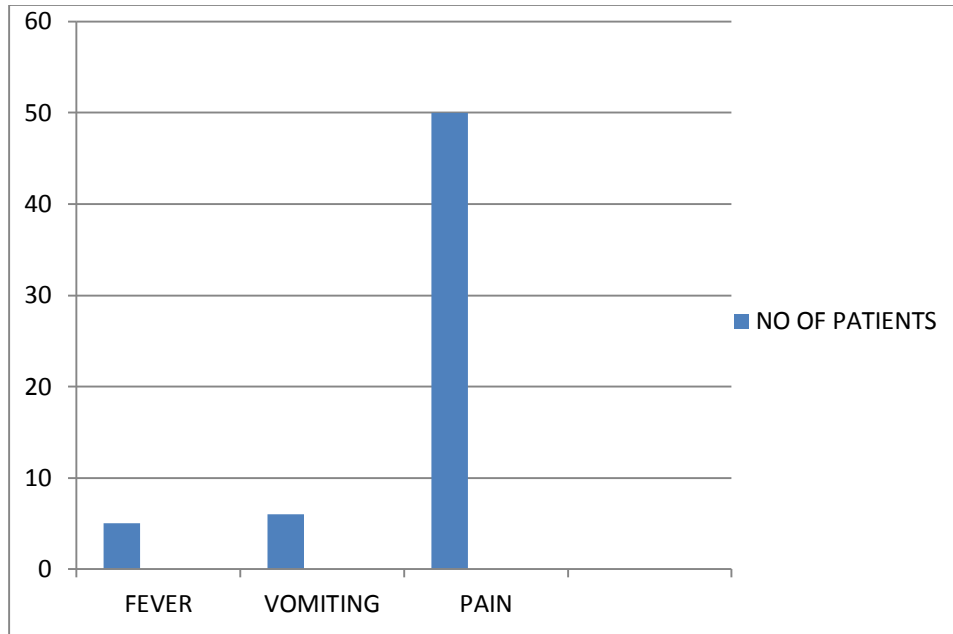
**Fig 1. No. of patients**

In our study, of a total population of 50 patients, 26 patients (52 %) are female and 24 patients (48%) are male .



***Fig 2 . Age and sex distribution .***

In the study, the age group with maximum number of cases with chronic right lower quadrant pain was the 21 – 30 years , in both males and females , the total sum being 22 cases among the 50 cases , accounting to 44% of the total cases .

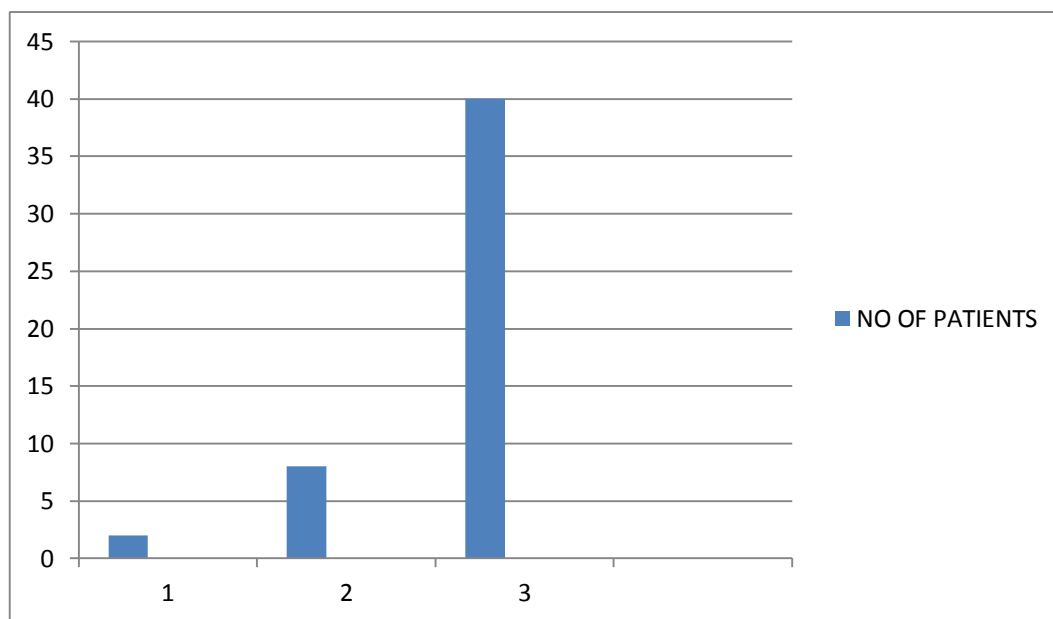


**Fig 3. *Pre – op symptoms***

This fig shows that all the 50 patients ( 100% ) had right lower quadrant abdominal pain and along with that 5 patients (10% ) had fever and 6 patients ( 12% ) had vomiting.

	Frequency	Percent	Valid Percent	Cumulative Percent
1	2	4.0	4.0	4.0
2	8	16.0	16.0	20.0
3	40	80.0	80.0	100.0
Total	50	100.0	100.0	

**Tab 2 . Pain improvement after 6 weeks .**

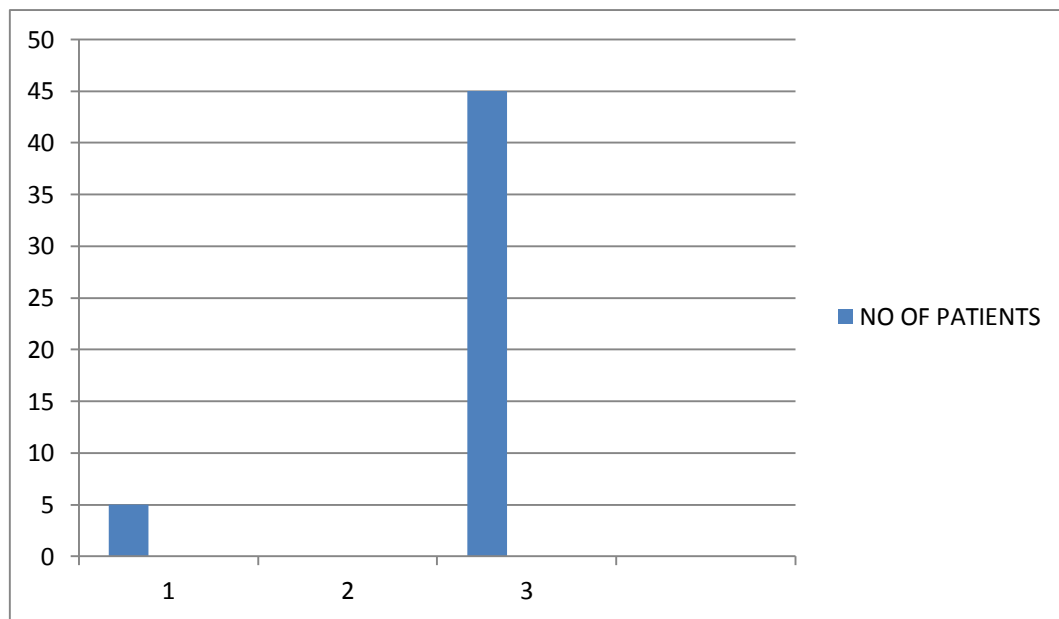


**Fig 4 . Pain improvement after 6 weeks .**

This fig shows 40 patients ( 80% ) showed relief of pain and 8 patients ( 16% ) showed remarkable pain relief , while 2 patients (4%) still complained of right lower quadrant pain after 6 weeks.

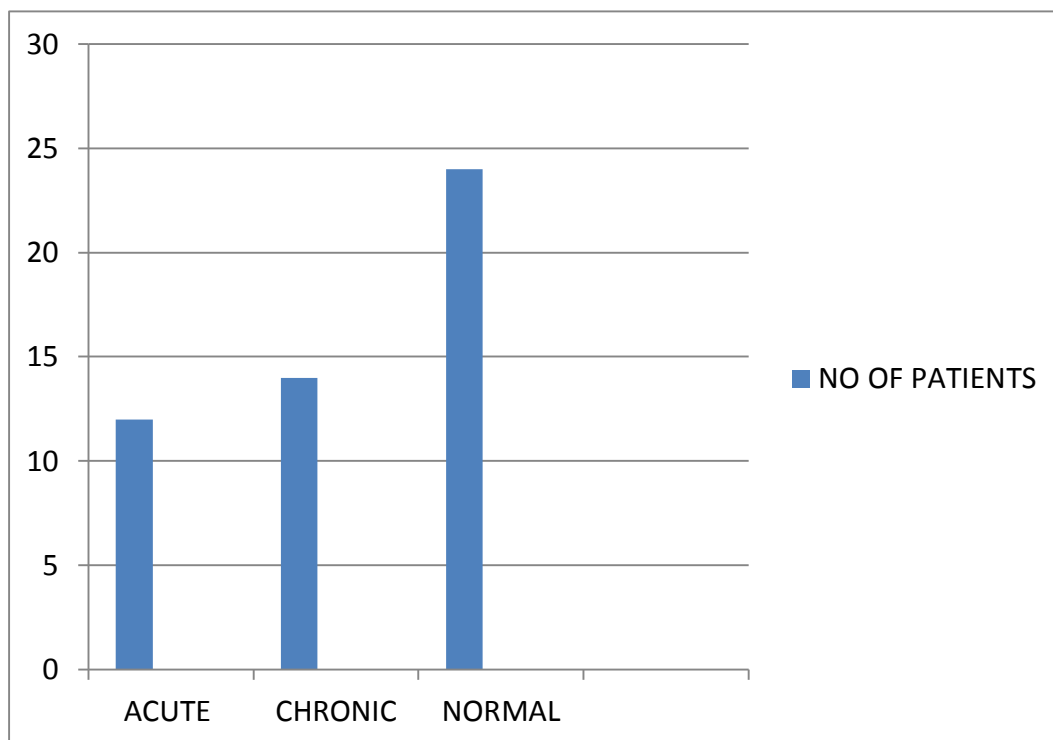
		Frequency	Percent	Valid Percent	Cumulative Percent
	1	5	10.0	10.0	10.0
Valid	3	45	90.0	90.0	100.0
	Total	50	100.0	100.0	

**Tab 3 . Pain improvement after 3 months**



**Fig 5 . Pain improvement after 3 months .**

This fig shows 45 patients ( 90% ) showed relief of pain and 5 patients ( 10% ) complained of right lower quadrant pain persistence after 3 months.



**Fig 6. Histopathological features of removed Appendix.**

This fig shows that 12 patients ( 24% ) had acute features of inflammed appendix, 14 patients (28%) had chronic histopathological features and 24 patients ( 48% ) had normal features.



<b>NULL HYPOTHESIS</b>	<b>TEST</b>	<b>SIGNIFICANCE</b>	<b>DECISION</b>
Histopathology of the removed appendix is not related to the pain relief at 6th week follow-up	Independent samples Mann – Whitney U test	0.64552	Retains the null hypothesis

p value < 0.05 is significant .

<b>NULL HYPOTHESIS</b>	<b>TEST</b>	<b>SIGNIFICANCE</b>	<b>DECISION</b>
Histopathology of the removed appendix is not related to the pain relief at 3rd month follow-up	Independent samples Mann – Whitney U test	0.50286	Retains the null hypothesis

p value < 0.05 is significant .

## **DISCUSSION**

From our study, it has been shown that doing an appendectomy in patients presenting with chronic right quadrant pain is more likely to relieve the pain than in leaving the appendix in situ.

Right lower quadrant abdominal pain was the chief complaint in all of the 50 patients ( 100% ) and 5 patients ( 10% ) had fever and 6 patients ( 12% ) had vomiting . It has been identified that except chronic and recurrent right lower quadrant pain, no other clinical characteristics helps in establishing the diagnosis of chronic appendicitis, unlike in acute appendicitis. There were neither typical signs and symptoms nor routine diagnostic modalities to diagnose chronic appendicitis.

In our study, no post – op complications or post – op deaths were encountered.

In our study, it shows that 40 patients ( 80% ) had complete relief of right lower quadrant pain after 6 weeks after laparoscopy appendectomy and at the end of the 3 months after, 45 patients ( 90% ) had complete relief but still 5 patients ( 10% ) complained of right lower quadrant abdominal pain .

In Netherlands, a study was performed in a teaching hospital between Sep 1994 to Nov 2004 by Dr. R.M.H. Roumen and his colleagues. This study was a single center, double – blinded randomized control trial and patients with chronic right lower quadrant abdominal pain ,were evaluated . Of the 40 patients, 18 patients had undergone laparoscopic appendectomy and 22 patients had undergone diagnostic laparoscopy only. Six months after surgery based on pain score, they observed that in the appendectomy group higher proportion of patients had significant relief of pain than patient who underwent only diagnostic laparoscopy only. In patients who still had RLQ pain and appendix in situ, second time diagnostic laparoscopic procedure intended for appendectomy was done.

The secondary outcome was evaluated for the relationship between the clinical response and the appendiceal histopathology and concluded that the RLQ pain can be treated successfully by elective appendectomy in properly selected patients . Histopathology of the removed appendix does not contribute to the diagnosis. In the inspection only group, two patients had to undergo emergency appendectomy, indicating the risks and the economical burden of the patients .

In Fayed et al. study, 63 patients who had appendectomy for chronic RLQ pain were evaluated. In 92% of removed appendices, histopathological abnormalities were found and 95% patients were cured completely after appendectomy. This study concluded that the chronic appendicitis does exist as a separate entity and could be the cause of chronic RLQ pain.

Krone and Sperke analysed 1,718 prophylactic appendectomies during gynaecological operations. They found histopathological proof of acute appendicitis in 8 % and signs of chronic appendicitis in a whopping 65% and only in 21% were microscopically normal. The clinical relevance remains unclear in patients undergoing an "en passant" appendectomy with a high percentage of pathological appendices.

This lack of correlation between clinical pain score and histopathology suggests that there might be a non-inflammatory pain pathway.

But in a study by Dr. Popovic et al. between 1999 and 2000 published in the Croatian medical journal, out of 53 patients 41 underwent laparoscopic appendectomy. The study concluded that laparoscopic appendectomy had long – term results similar to the patients without appendectomy and also revealed that whether the removed appendix was normal or with pathological changes, the therapeutic results were similar. But based on the experience, they mentioned that the appendectomy must be performed, though there are no visible changes macroscopically due to changes intra – luminally.

In our study 45 patients ( 90% ) were rendered free from pain after laparoscopic appendectomy but 5 patients (10%) still complained of right lower quadrant abdominal pain.

Though the clinical data is convincing on pain relief after the appendectomy, the histopathological findings are tough to comprehend relating to this context and also no correlation between them. There is inconsistency between the symptomatology and histopathological findings.

## **CONCLUSION**

In patients with chronic right lower quadrant abdominal pain, elective laparoscopic appendectomy could be an effective therapeutic procedure in properly selected patients. Histopathological findings of the removed appendix does not contribute in establishing the diagnosis in these patients. However strenuous efforts must be taken in pre – assessment of these patients, in order to identify patients who might benefit from the surgery. A definitive therapeutic procedure can be undertaken laparoscopically in most patients instead of resorting to open laparotomy.

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# PATIENT PROFORMA

Name :                      Age :            Sex :            IP No :

**ON ADMISSION :**

Main Complaints :

Duration of Complaints :

Co – Morbid Illness :

Significant Past History :

### CLINICAL EXAMINATION :

Pulse : BP :

RR : Temp :

Pallor : Icterus :

CVS : RS :

P/A :

### **INVESTIGATIONS :**

CBC : Liver Function Test :

ESR : Renal Function Test :

CXR : USG Abdomen :

CECT ABDOMEN:

### **TREATMENT :**

Intra - op Findings .

### **FOLLOW UP :**

Pain Score : at 6 weeks :

at 3 months :

Histo - pathological studies :

## MASTER CHART

ABBREVIATIONS	
P	Pain
V	Vomiting
F	Fever
HPE	Histopathology
A	Acute appendicitis
N	Normal
C	Chronic appendicitis
P/V	Pain/Vomiting
P/F	Pain/Fever

S. no	NAME	AGE	SEX	I.P no	D.O.A	D.O.S	D.O.D	Pre-OP sympto ms	6 weeks	3 months	HPE
1	Mythili	42	F	83019	26.1.15	2.2.15	7.2.15	P	3	3	C
2	Sheela	28	F	10565	30.1.15	3.2.15	8.2.15	P	2	3	A
3	Anjalai	30	F	12501	2.2.15	6.2.15	12.2.15	P / V	3	3	N
4	Kantha	27	F	62441	31.1.15	7.2.15	10.2.15	P	2	1	C
5	Sangeetha	28	F	14404	4.2.15	11.2.15	15.2.15	P / V	3	3	C
6	Arun kumar	19	M	15297	6.2.15	13.2.15	18.2.15	P / F	3	3	N
7	Venkatesan	27	M	18194	14.2.15	20.2.15	24.2.15	P	3	3	N
8	Vedavalli	36	F	19023	15.2.15	25.2.15	2.3.15	P	1	1	A
9	Joseph	32	M	22182	22.2.15	3.3.15	6.3.15	P / F	3	3	C
10	Bhavani	19	F	22567	24.2.15	4.3.15	7.3.15	P / V	3	3	A
11	Prakash	26	M	21657	25.2.15	4.3.15	8.3.15	P	3	3	N
12	Deenadhayalan	38	M	22294	26.2.15	5.3.15	10.3.15	P	3	3	C
13	Raja	36	M	23296	1.3.15	6.3.15	10.3.15	P	3	3	C
14	Vishwanath	18	M	23676	3.3.15	7.3.15	11.3.15	P	3	3	A
15	Rajendran	40	M	20394	4.3.15	9.3.15	13.3.15	P / F	3	3	C
16	Parthiban	24	M	25269	6.3.15	12.3.15	14.3.15	P	3	3	N
17	Ashok	22	M	24844	6.3.15	12.3.15	16.3.15	P	2	3	N
18	Sneha	23	F	29017	7.3.15	20.3.15	24.3.15	P	3	3	C
19	Raman	18	M	28382	10.3.15	22.3.25	28.3.25	P / V	3	3	A
20	Babu	22	M	28867	12.3.15	23.3.15	30.3.15	P	3	3	N
21	Sivagami	32	F	28054	14.3.15	24.3.15	1.4.15	P / V	3	3	N
22	Navamani	19	F	28467	18.3.15	27.3.15	4.4.15	P	3	3	A
23	Gunasundar	40	M	29477	20.3.15	28.3.15	6.4.15	P	2	1	C
24	Jothy kumar	26	M	31350	21.3.15	20.3.15	6.4.15	P	3	3	N
25	Bhuvanesh	23	M	33200	24.3.15	1.4.15	7.4.15	P	3	3	A
26	Anandhi	25	F	31782	25.3.15	2.4.15	5.4.15	P	3	3	A
27	Jothika	26	F	34527	26.3.15	4.4.15	8.4.15	P	3	3	N



S. no	NAME	AGE	SEX	I.P no	D.O.A	D.O.S	D.O.D	Pre-OP sympto ms	6 weeks	3 months	HPE
28	Indhumathi	18	F	34839	27.3.15	6.4.15	10.4.15	P / F	3	3	N
29	Jaya	36	F	33132	27.3.15	7.4.15	10.4.15	P	2	1	N
30	Kalyani	57	F	36484	2.4.15	9.4.15	12.4.15	P	3	3	C
31	Robert	24	M	36111	4.4.15	9.4.15	13.4.15	P	3	3	A
32	Valliappan	38	M	38111	5.4.15	11.4.15	14.4.15	P	3	3	N
33	Ram	45	M	39739	14.4.15	21.4.15	24.4.15	P	3	3	C
34	Sheela	40	F	41786	16.4.15	25.4.15	29.4.15	P / V	2	3	N
35	Rajendran	32	M	42288	18.4.15	25.4.15	30.4.15	P	3	3	A
36	Kanchana	35	F	43129	19.4.15	28.4.15	1.5.15	P / F	3	3	C
37	Kuppammal	50	F	39818	20.4.15	2.5.15	4.5.15	P	3	3	C
38	Ranjith	32	M	50138	24.4.15	4.5.15	8.5.15	P	3	3	N
39	Saranya	23	F	51165	26.4.15	18.5.15	12.5.15	P	2	3	A
40	Shanthi	37	F	50862	29.4.15	19.5.15	23.5.15	P	3	3	N
41	Nagarani	26	F	53030	15.5.15	20.5.15	24.5.15	P	3	3	N
42	Dhanasekar	40	M	57917	16.5.15	22.5.15	26.5.15	P	3	3	N
43	Arjun	25	M	53825	16.5.15	23.5.15	23.5.15	P	3	3	N
44	kani	19	F	52656	17.5.15	24.6.15	29.5.15	P	3	3	N
45	Sivaprakash	24	M	58412	24.5.15	2.6.15	5.6.15	P	3	3	A
46	Lakshmi	27	F	58815	29.5.15	4.6.15	7.6.15	P	3	3	N
47	Kanagaraj	27	M	57130	31.5.15	11.6.15	15.6.15	P	1	1	C
48	Kalaiselvan	19	F	63801	5.6.15	12.6.15	16.6.15	P	3	3	N
49	Lavanya	20	F	64084	6.6.15	13.6.15	17.6.15	P	2	3	N
50	Saranya	23	F	69679	10.6.15	15.6.15	18.6.15	P	3	3	N

## CONSENT FORM

**Study Detail** : “A STUDY ON THE ROLE OF ELECTIVE  
LAPAROSCOPIC APPENDECTOMY FOR  
CHRONIC RIGHT LOWER QUADRANT PAIN”

**Study Centre** : Rajiv Gandhi Government General Hospital, Chennai.

**Patient's Name** :

**Patient's Age** :

**In Patient** :  
**Number**

Patient may check (☒) these boxes

I confirm that I have understood the purpose of procedure for the above ☐  
study. I have the opportunity to ask question and all my questions and  
doubts have been answered to my complete satisfaction.

I understand that my participation in the study is voluntary and that I am ☐  
free to withdraw at any time without giving reason, without my legal  
rights being affected.

I understand that sponsor of the clinical study, others working on the ☐  
sponsor's behalf, the ethical committee and the regulatory authorities  
will not need my permission to look at my health records, both in  
respect of current study and any further research that may be  
conducted in relation to it, even if I withdraw from the study I agree to  
this access. However, I understand that my identity will not be  
revealed in any information released to third parties or published,  
unless as required under the law. I agree not to restrict the use of any  
data or results that arise from this study.

I agree to take part in the above study and to comply with the instructions ☐  
given during the study and faithfully cooperate with the study team  
and to immediately inform the study staff if I suffer from any  
deterioration in my health or well being or any unexpected or unusual  
symptoms.

I hereby consent to participate in this study ☐

I hereby give permission to undergo complete clinical examination and ☐  
diagnostic tests including hematological, SSbiochemical,  
radiological tests and to undergo treatment